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EP 0390431 A US 5137413 A

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UK CL (Edition M) B7B BAA BAB BAD BEA BLB BLC1 BLD
INT CL[5] A61G , B60P , B62D
Online databases: WPIL

(54) Transporting wheelchairs in road vehicles

(57) A rear access vehicle is provided with a pair of parallel laterally spaced troughs (10) extending longitudinally of the vehicle floor adjacent the rear access opening. Each trough (10) has a generally horizontal base below the level of the vehicle floor. A rear bumper section (24) is pivotally mounted to be movable between a raised normal position and a lowered position providing unimpeded access to the rearwardly directed opening in each trough (10). Detachable or telescopic ramps (22) are connectable to the vehicle to extend from the rearwardly directed openings in the troughs (10) to the ground. Since the level of the base of each trough (10) is lower than the level of the vehicle floor the ramps may be positioned at an acceptable angle to the horizontal to permit a wheelchair and its occupant to be wheeled comfortably up or down the ramps.

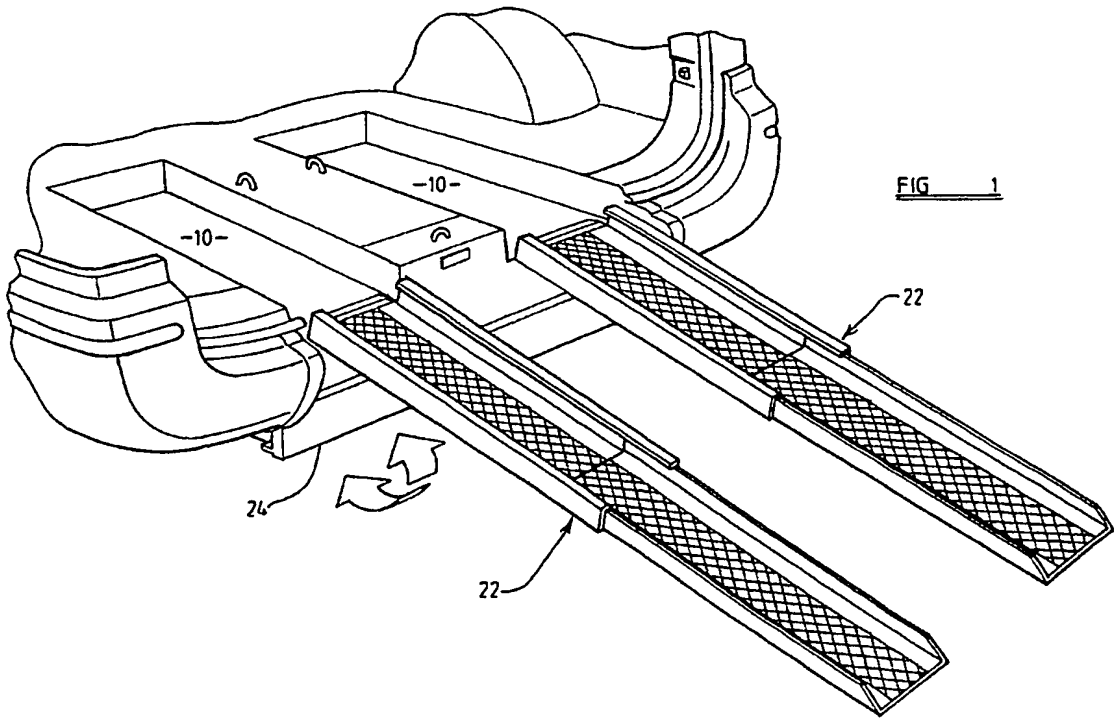

FIG 1

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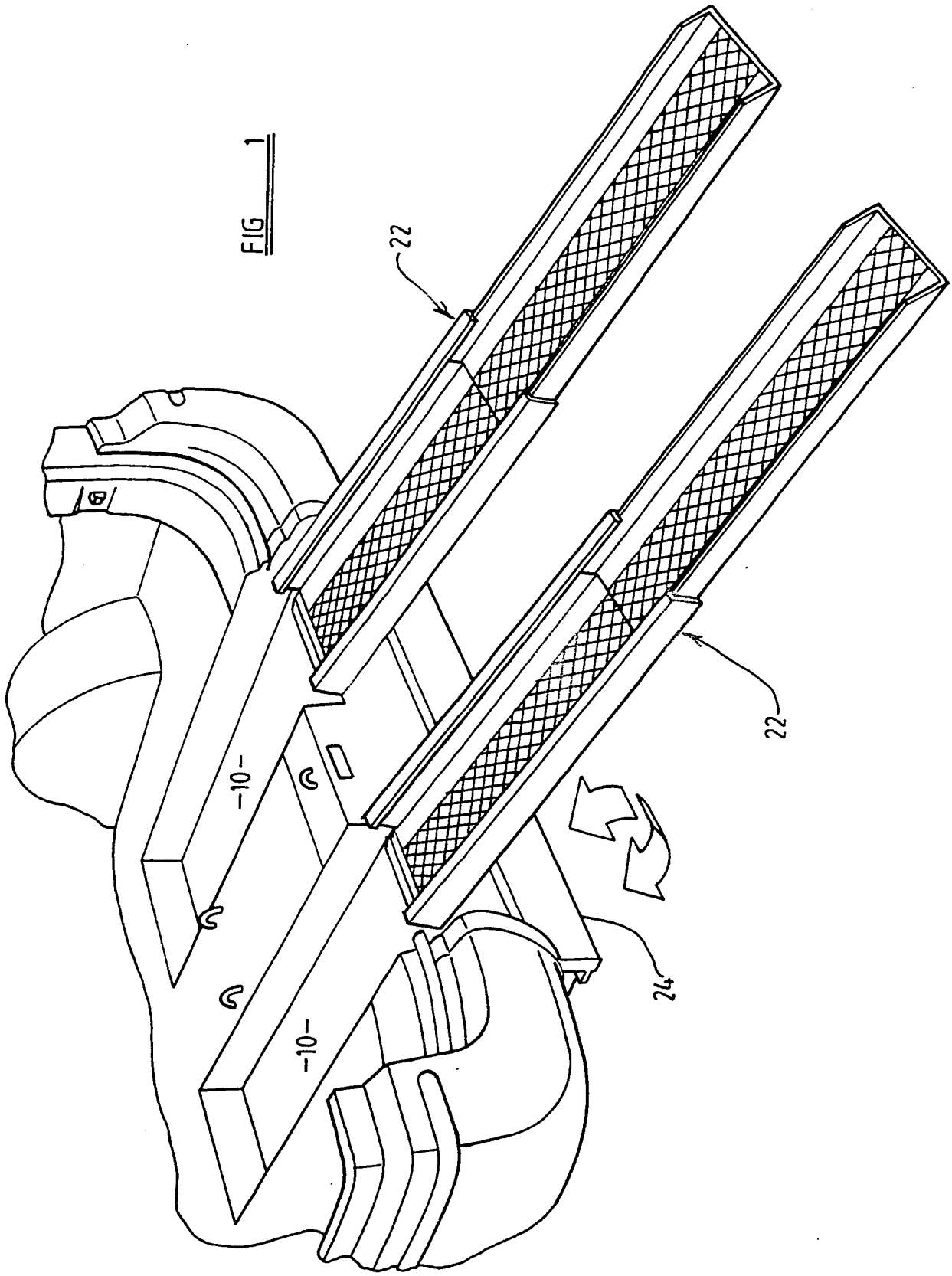
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

FIG 1



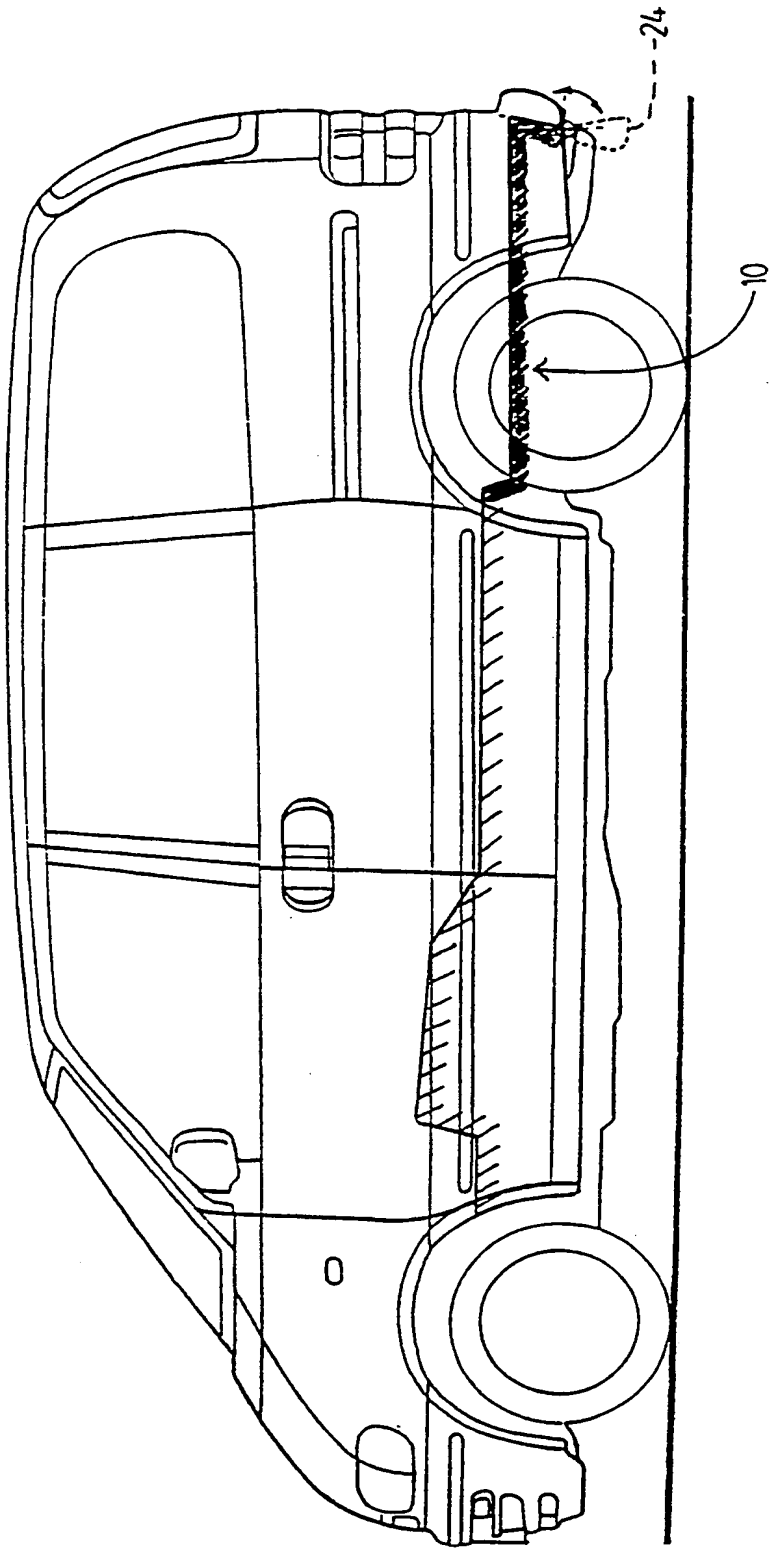


FIG 2

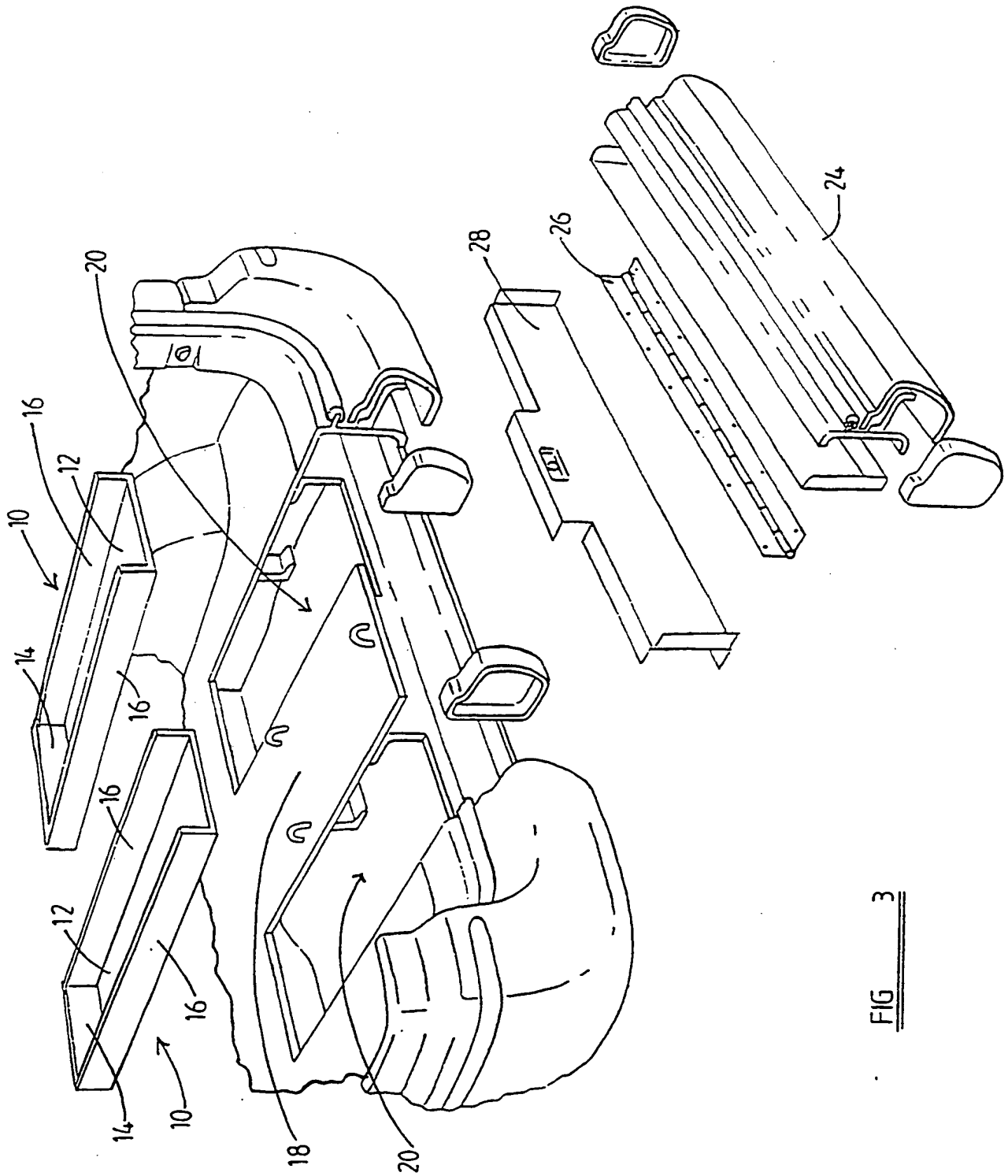


FIG 3

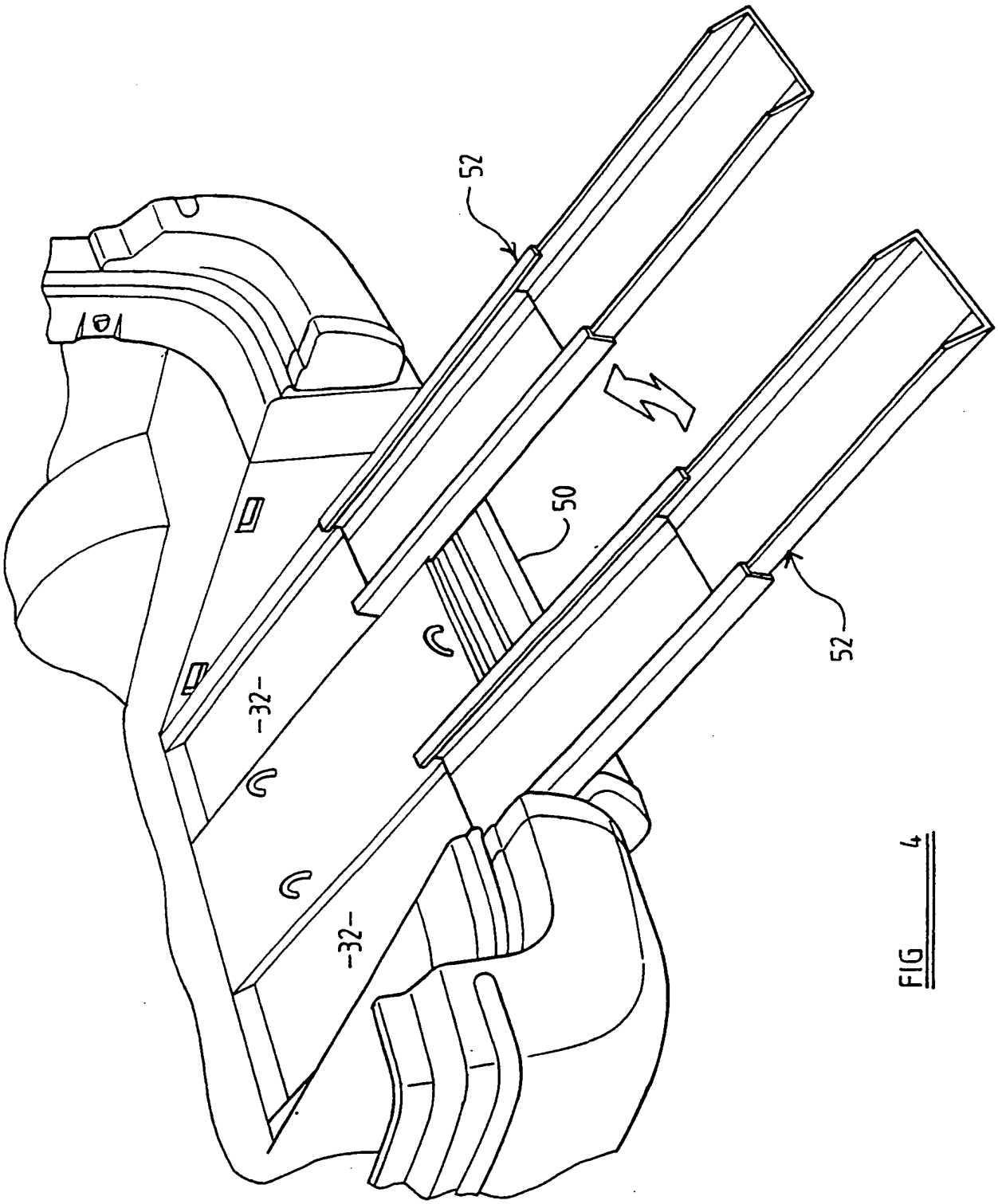


FIG 4

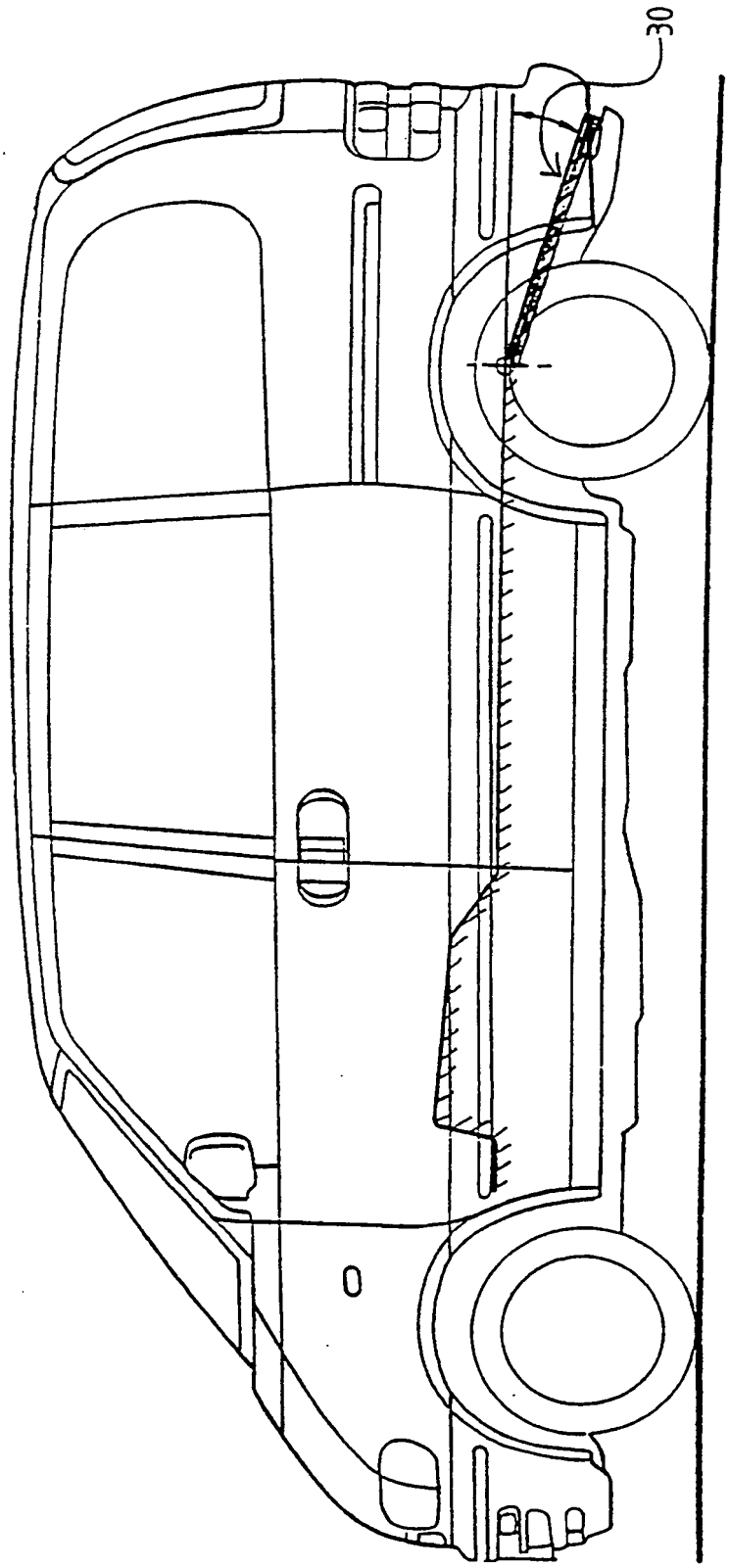


FIG 5

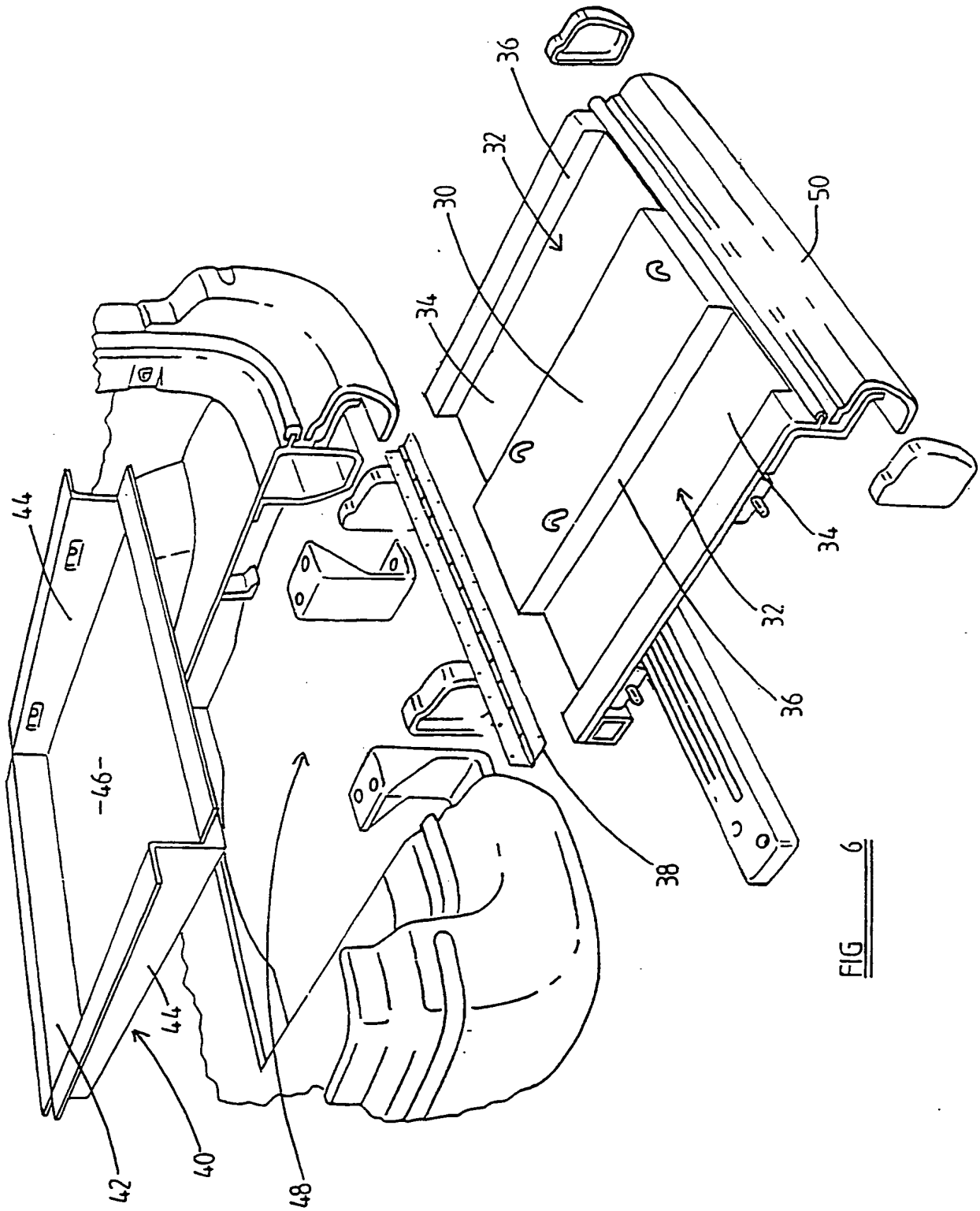


FIG 6

PATENTS ACT 1977

BT/A7703GB/JW-D9

TITLE: **Road Vehicle**

This invention relates to an engine driven road vehicle of the type having a rear access door and which is adapted for the transportation of disabled people in wheelchairs.

One of the problems in transporting wheelchair-bound persons in road vehicles is that of ensuring that there is sufficient headroom for the person in the wheelchair since the height of the wheelchair seat above the vehicle floor is generally greater than the height of the conventional vehicle seats above the vehicle floor. One means of overcoming this problem has been to provide a specially adapted roof section for the vehicle to provide an increased height to the roof level and thus provide increased headroom in general.

Another problem is in providing means for ensuring a smooth entry and exit of the wheelchair into and out of the vehicle. One known means of effecting such entry and exit is to position ramps to extend from the floor of a vehicle adjacent an open side door thereof to the ground; such an arrangement has been used for example to enable transportation of wheelchairs in conventional taxi cabs where the access had been through a passenger side door. Conventional taxi cabs usually have a relatively large floor to roof dimension and thus there has not usually been a problem in providing sufficient headroom for a wheelchair occupant carried in the taxi.

Rear access vehicles do not usually provide the same relatively large floor to roof dimension as is provided for example by a conventional taxi cab. Vehicles having rear access doors are often designed with part of the running gear of the vehicle immediately below the floor at the rear of the vehicle and/or the fuel tank and/or the spare wheel may be located below the floor at the rear of the vehicle. In such designs there is no possibility of lowering the whole of the vehicle floor to provide increased headroom.

It will be appreciated therefore that there are at least two problems to be overcome in adapting such a rear access vehicle for the transportation of wheelchair-bound passengers, namely (1) because of the relatively high floor level adjacent the rear door opening it would be necessary to provide unusually long ramps to provide an acceptable angle to the horizontal for the running of a wheelchair up and down the ramps into and out of the vehicle and (2) there would be insufficient headroom for a wheelchair occupant to travel comfortably when the wheelchair is inside the vehicle.

It is an object of the present invention to provide a new and improved vehicle design which will overcome at least some of the problems encountered in the transportation of wheelchair occupants.

In accordance with one aspect of the invention there is provided a road vehicle having a rear access door and which is adapted to receive a wheelchair through said rear access door for transportation in the vehicle adjacent the rear access wherein the floor adjacent the rear access includes at least one trough member extending longitudinally of the vehicle, the base of the or each said trough member being disposed below the level of the floor and having a rearwardly directed opening at the base level of the trough member, the arrangement being that when the access door of the vehicle is open said opening in the trough member permits entry therethrough of the wheels of a wheelchair whereby a wheelchair may be wheeled freely through said opening from or to one or more ramps extending between said opening and the ground.

Thus when a wheelchair has been wheeled through said opening onto said trough member the wheelchair occupant will enjoy a headroom which is in excess of that which would be available if the wheelchair had been positioned on the floor itself.

Conveniently two said trough members are provided comprising a pair of parallel laterally spaced troughs extending longitudinally of the vehicle.

The or each ramp may be detachable from the vehicle and transportable thereby in a stored position, or the or each ramp may be telescopically mounted on the vehicle at said opening.

The or each said trough member may be provided as a fixed member in a fixed floor of the vehicle, or a floor section including one or more trough members may be pivotable upwardly and downwardly relative to the remainder of the vehicle floor, or the or each trough member may be individually pivotable upwardly and downwardly relative to the vehicle floor.

Conveniently a section of the rear bumper of the vehicle is pivotally mounted thereto and is movable between an upper normal position and a lower position whereby, in said lower position, unimpeded access to the said rearwardly directed opening at the base level of the or each trough member is available when the rear access door of the vehicle is open.

Other features of the invention will become apparent from the following description given herein solely by way of example with reference to the accompanying drawings wherein:-

Figure 1 is an illustrative perspective view of part of the rear of a rear access vehicle showing fixed trough members in the vehicle floor and detachable ramps extending from the trough members to the ground;

Figure 2 is a diagrammatic side elevation of a rear access vehicle illustrating the position of the trough members;

Figure 3 is a diagrammatic exploded view showing the component parts of the trough members and a pivoted section of the rear bumper of the vehicle;

Figure 4 is an illustrative perspective view of part of the rear of a rear access vehicle showing an alternative embodiment of the invention;

Figure 5 is a diagrammatic side elevation of a rear access vehicle showing the position of the trough members of Figure 4; and

Figure 6 is a diagrammatic exploded view of the component parts of the embodiment of the invention illustrated in Figures 4 and 5.

In Figure 1 of the drawings there is illustrated part of the rear floor section of a rear access vehicle adapted for the transportation of wheelchair occupants in accordance with the invention. The vehicle is conveniently of the type illustrated more fully in Figure 2 comprising what is known generally as a multi-purpose vehicle or "people carrier" which includes side driver and passenger doors and a rear access door. The normal headroom provided between the floor and the roof in such a vehicle is generally insufficient to accommodate a wheelchair occupant carried in the vehicle and thus in accordance with the invention the vehicle illustrated in the drawings is provided with a pair of parallel laterally spaced troughs 10 extending longitudinally of the vehicle adjacent the rear access opening. Each of the troughs 10 is conveniently fabricated of steel to a generally rectangular configuration as shown in Figure 3 and includes a horizontally disposable base 12, one vertically disposable end wall 14 and two vertically disposable opposed side walls 16. The end of each trough adjacent the rear access opening of the vehicle (i.e. the end of the trough opposite to the end wall 14) is itself open.

As shown in Figure 3, each trough 10 is fixedly mounted in the vehicle floor by securing each trough, as by welding, into a corresponding aperture 20 which is cut out of the vehicle floor pan. As will be seen from Figure 1, wheelchair access to and from the vehicle is effected by means of detachable ramps 22 which may be positioned to extend from the rearwardly directed openings in the troughs 10 to the ground. Since the level of the base 12 of each trough is lower than the level of the existing floor 18 of the vehicle, the ramps may be positioned at an acceptable angle to the horizontal to permit a wheelchair and its occupant to be wheeled comfortably up or down the ramps into the vehicle.

In order to effect a smooth and uninterrupted transition from the ramps to the troughs a section 24 of the rear bumper of the vehicle is pivotally mounted thereto by means for example of an elongate piano type hinge 26 as illustrated in Figure 3. The lower edge of the bumper section 24 has one element

of the hinge 26 secured thereto and the other element of the hinge is secured adjacent the lower edge of a rear closure panel 28. When the rear door of the vehicle is open the bumper section 24 may be pivoted downwardly as illustrated in Figures 1 and 2 whereby the upper ends of the ramps may then be positioned on top of the steel closure panel 28 at the rear of the floor pan thus to provide a smooth transition between the tracks afforded by the ramps 22 and the bases 12 of the troughs 10.

An alternative embodiment of the invention is illustrated in Figures 4 to 6 wherein, referring to Figure 4, a floor section 30 of the vehicle adjacent the rear access opening is pivotally mounted to the vehicle and includes a pair of parallel laterally spaced apart troughs 32 extending longitudinally thereof. As will be seen more clearly from Figure 6, the pivoted floor section 30 is of generally rectangular plan form and conveniently comprises a steel fabrication having the two troughs 32 formed therein each of which is provided with a horizontally disposable base 34, vertical opposed side walls 36, and opposed open ends. The, in use, forward end of the floor section 30 is pivotally mounted for example as by an elongate piano type of hinge 38 as shown in Figure 6 to the forward end of a fabricated undertray 40. The undertray 40 has a rearwardly directed open end, a front wall 42 and two opposed side walls 44 each of which is of a tapering configuration whereby the base 46 of the undertray is inclined to the horizontal when the undertray is mounted, as by welding, in an aperture 48 cut out of the floor pan. It will be appreciated that the floor section 30 may thus be pivoted from an upper horizontal position in which a wheelchair may be carried with its wheels in the troughs 32 to a lower inclined position in which it is pivoted downwardly within the undertray 40 to facilitate loading and unloading of the wheelchair from the vehicle.

A centre section 50 of the vehicle bumper is integral with the rear edge of the pivoted floor section 30 whereby when the floor section is pivoted to its lower position detachable ramps 52 may be readily positioned to provide smooth and unimpeded access for a wheelchair to be run up or down the ramps

onto the bases 34 of the troughs 32. When a wheelchair occupant has been positioned in the vehicle the floor section 30 may be pivoted upwardly such as for example by a hydraulic motor or by mechanical means so that the floor section is horizontal and the bumper section 50 is in line with the fixed parts of the rear bumper of the vehicle. Preferably locking means are provided to prevent the floor section being pivoted downwardly when the rear access door or the vehicle is closed.

The ramps 52, or the ramps 22 described with reference to Figures 1 to 3 may be detachable and telescopic or may be telescopic and pivotally mounted at their upper ends to the openings at the rear of the respective troughs.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A road vehicle having a rear access door and being adapted to receive a wheelchair through said rear access door for transportation in the vehicle adjacent the rear access opening wherein the vehicle floor adjacent the rear access opening includes at least one trough member extending longitudinally of the vehicle, the base of the or each trough member being disposed below the level of the vehicle floor and the or each trough member having a rearwardly directed opening therein at its base level, the arrangement being that when the access door of the vehicle is open, said rearwardly directed opening in the or each trough member permits entry therethrough of the wheels of a wheelchair whereby a wheelchair may be wheeled freely through said rearwardly directed opening from or onto one or more ramps extending between said rearwardly directed opening and the ground.

2. A vehicle as claimed in claim 1 wherein two said trough members are provided comprising a pair of parallel laterally spaced troughs extending longitudinally of the vehicle.

3. A vehicle as claimed in either one of claims 1 or 2 wherein the or each said trough member is provided as a fixed member in a fixed floor of the vehicle.

4. A vehicle as claimed in claim 3 wherein one or more sections of a rear bumper of the vehicle is pivotably mounted thereto and is movable between a raised normal position in which it extends above the base level of the or each trough member, and a lowered position in which the or each said bumper section is below the base level of the or each trough member whereby unimpeded access to the said rearwardly directed opening at the base level of the or each trough member is available when the rear access door of the vehicle is open.

5. A vehicle as claimed in either one of claims 1 or 2 wherein the or each trough member is pivotally mounted relative to the floor of the vehicle and is movable between a raised position in which the base of the or each trough member is generally parallel to the vehicle floor, and a lowered position in which the base of the or each trough member is inclined downwardly and rearwardly towards the rear access opening of the vehicle.

6. A vehicle as claimed in claim 5 wherein the or each trough member is provided in a floor section of the vehicle pivotally mounted to the vehicle floor at a forward end of said section, pivotal movement of said floor section providing movement of the or each trough member between said raised and lowered positions.

7. A vehicle as claimed in either one of claims 5 or 6 wherein a rear bumper section is provided adjacent the rear of the or each trough member and is movable therewith between said raised and lowered positions.

8. A vehicle as claimed in any one of the preceding claims wherein the or each said ramp is detachable from the vehicle and transportable therewith in a stored position.

9. A vehicle as claimed in any one of claims 1 to 7 wherein the or each said ramp is telescopically mounted on the vehicle adjacent the rearwardly directed opening in a respective trough member.

10. A vehicle having a vehicle floor including at least one trough member constructed and arranged substantially as hereinbefore described with reference to any one of Figures 1 to 3 of the accompanying drawings.

11. A vehicle having a vehicle floor including at least one trough member constructed and arranged substantially as hereinbefore described with reference to any one of Figures 4 to 6 of the accompanying drawings.

12. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

Application number
GB 9306978.9

Relevant Technical Fields

(i) UK Cl (Ed.M) B7B (BLB,BLD,BLC1,BEA,BAA,BAB,BAD)

(ii) Int Cl (Ed.5) A61G B62D B60P

Search Examiner
Pat Everett

Date of completion of Search
19 May 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES : EDOC WPIL

Documents considered relevant following a search in respect of Claims :-
1-11

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	EP 0390431 A	(BROTHERWOOD) Figures 2 and 3	1,3
X	US 5137413 A	(RESSLER) Figures 1 and 6 and column 5 lines 34-56	1,4

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).